REMARKS/ARGUMENTS

Status of Claims

Claims 1-19 stand rejected.

Thus, claims 1-19 are pending in this patent application.

The Applicants hereby request further examination and reconsideration of the presently claimed application.

Claim Rejection – 35 U.S.C. § 103

Claims 1-3, 5-8, 10-12, 14-17, and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over European Patent Application 1 054 524 (*Kubo*) in view of U.S. Patent 7,099,578 (*Gerstel*). Claims 4, 9, 13, and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Kubo* in view of *Gerstel* and U.S. Patent Application Publication 2003/0161629 (*Frascolla*). Claims 2-9 and 19 depend from independent claim 1, claims 11-14 depend from independent claim 10, and claims 16-18 depend from independent claim 15. Thus, claims 1-19 stand or fall on the application of the combination of *Kubo* and *Gerstel* to independent claims 1, 10, and 15. The United States Supreme Court in *Graham v. John Deere Co. of Kansas City* noted that an obviousness determination begins with a finding that "**the prior art as a whole in one form or another contains all" of the elements of the claimed invention**. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 22 (U.S. 1966) (emphasis added). The Applicants respectfully assert that the combination of *Kubo* and *Gerstel* fails to disclose all of the elements of independent claims 1, 10, and 15, and consequently fails to render obvious claims 1-19. In addition, *Kubo* cannot be combined *Gerstel* to achieve the solution of claims 1-19.

First, the combination of *Kubo* and *Gerstel* fails to render claims 1-19 obvious because the combination of *Kubo* and *Gerstel* fails to disclose a switching device designed to switch signals in specified working channels to specified protection channels and to switch signals in specified protection channels to specified working channels according to switching requests from the WDM system. Claims 1, 10, and 15 read:

> 1. A WDM layer-based OchP (Optical Channel Protection) device capable of signal transmission through and routing between working channels and protection channels to/from a WDM system, comprising
>
> a transmitting module and
>
> a receiving module;
>
> the transmitting module and the receiving module each comprising
>
> N working channels to be connected to receiving ends and to transmitting ends of N working channels of the WDM system respectively,
>
> M protection channels to be connected to receiving ends and to transmitting ends of M protection channels of the WDM system respectively; and
>
> **a switching device designed to switch signals in specified working channels to specified protection channels and to switch signals in specified protection channels to specified working channels according to switching requests from the WDM system**; wherein M and N are natural numbers and M<N.
>
> 10. A WDM layer-based optical channel protection device for a multi-channel WDM system comprising
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> a transmitter comprising
>
> N transmitter inputs;
>
> N working outputs, each working output being connected to the receiving end of a working channel of the WDM system;
>
> M protection outputs, each protection output being connected to the receiving end of a protection channel of the WDM system; and
>
> a transmitter switching unit capable of directing signals from the N signal inputs to the N working outputs and to the M protection outputs; and
>
> a receiver comprising
>
> N receiver outputs;
>
> N working inputs, each working input being connected to the transmitting end of a working channel of the WDM system;
>
> M protection inputs, each protection input being connected to the transmitting end of a protection channel of the WDM system; and
>
> a receiver switching unit capable of directing signals to the N signal outputs from the N working inputs and from the M protection inputs;

wherein the transmitter switching unit and the receiver switching unit are designed to switch signals in specified working channels to specified protection channels or switch signals in specified protection channels back to specified working channels according to switching requests from the WDM system, and M is less than N.

15. A WDM layer-based optical channel protection method using the WDM layer-based optical channel protection device for a multi-channel WDM system according to claim 10, comprising

monitoring, by the WDM system, quality of signals carried by the channels,

determining, by the WDM system, based on the quality of a signal in a working channel whether to route the signal via a protection channel,

sending, by the WDM system, a first switching request to a transmitter switching unit to route the signal via a protection channel,

sending, by the WDM system, a second switching request to a receiver switching unit to route the signal via a protection channel, and

switching, by the transmitter switching unit or/and the receiver switching unit, the signal in the working channel to a protection channel or switching the signal in the protection channel back to a working channel according to the switching requests from the WDM system,

wherein the multi-channel WDM system comprises N working channels and M protection channels, M being less than N.

(Emphasis added). As shown above, claims 1, 10, and 15 recite a switching device designed to switch signals in specified working channels to specified protection channels and to switch signals in specified protection channels to specified working channels according to switching requests from the WDM system. For better understanding the WDM system described above, the Examiner is directed to paragraph 23 of the application:

> Here, whether the signal in a working channel is switched to a protection channel is determined by the performance of the working channel and is solely determined by the corresponding receiver in the WDM system without any additional detection device because all receivers in the WDM system possess the function. In addition, whether the signals transmitted through a protection channel are switched back to the working channel also is determined by the performance of the working channel; therefore, the protection solution is WDM layer-based.

The Examiner admits that *Kubo* fails to specifically disclose a switching device designed to switch signals according to switching requests from the WDM system. *See* December 31, 2009

Office Action, pp. 4 & 11. Instead, the Examiner asserts that *Kubo's* Figures 3 and 5 and paragraphs 46-48 disclose that the operating system detects the fault of the operating channel and sends the signal to the switch to switch the faulty operating channel to the standby channel. The cited sections of *Kubo* read:

> Fig. 5 is a flowchart illustrating an optical redundant switching method in an embodiment 3 of the optical wavelength multiplex system in accordance with the present invention. In the present embodiment 3, in the normal operation mode of the operation systems, the optical output with the standby wavelength is extinguished. If a fault takes place in one of the operating systems, the validity of the standby system is checked by emitting the optical output with the standby wavelength, and then the operating channel of the faulty operating system is switched to the standby optical terminal unit. When the faulty operating system is recovered, and the validity of the operating system is confirmed by emitting the optical output of the operating system, the optical output of the standby system is extinguished, and the switching to the recovered operating system is carried out.
>
> Next, the operation of the present embodiment 3 will be described.
>
> **The optical output of the standby wavelength is extinguished (step ST11) in the normal operation mode of the operating systems. If a fault takes place in any one of the operating systems (step ST12), the optical output of the standby wavelength is emitted (step ST13). The validity of the standby system is checked (step ST14), and the operating channel connected with the faulty operating system is switched to the standby optical terminal units 25a and 25b by the switching units 28a and 28b (step ST15)**. Subsequently, the faulty operating system is recovered (step ST16). After completing the recovery of the operating system, the optical output of the standby system is extinguished (step ST17). At the same time, the optical output of the recovered operating system is emitted (step ST18) to check its validity (step ST19). If the check result indicates an error, the optical output of the operating system is extinguished again (step ST20), and the optical output of the standby system is emitted again (step ST21) to carry out the recovery job (step ST16). When the faulty operation system becomes complete, the operating channel connected to the standby system is switched back to the original operating system (step ST22).

Kubo, ¶¶ 46-48 (emphasis added). As shown above, *Kubo* discloses that in the normal operation mode of the operation systems, the optical output with the standby wavelength is extinguished. If a fault takes place in one of the operating systems, the validity of the standby system is checked by emitting the optical output with the standby wavelength, and then the operating

channel of the faulty operating system is switched to the standby optical terminal unit. It can be seen that this portion generally discloses the switching from the faulty operating system to the standby optical terminal unit, and mainly illustrates how the gains of the amplifier can be adjusted according to changes in the number of wavelengths involved in the redundant switching by a conventional optical redundant switching method, i.e., the optical outputs of standby systems are extinguished in normal operation mode (ST11 in Figure 5) and the optical outputs of standby systems are emitted if fault occurs in operating systems (ST13 in Figure 5). Hence, it is inappropriate to liken the operating system to the WDM system as cited by the Examiner.

In addition, the Examiner asserts that *Gerstel's* switches 13, 13' selectively switch signals in the working channels to the protection channels and switch signals in the protection channels to the working channels according to switching requests from the WDM system (e.g. by controllers 3, 3'). *See* December 31, 2009 Office Action, pp. 4 & 11. As discussed in the Applicant's September 25, 2009 response, *Gerstel* generally relates to an apparatus for providing 1:N protection in an optical terminal of a WDM multi-channel optical communication network. In order to provide protection against network component failures for both protected and unprotected channels, *Gerstel's* optical communication network comprises a first line node comprising: (1) at least one first communication path; (2) at least a switch; and (3) a first detector. The first detector is **not** included in the transponder shown in *Gerstel's* FIG. 1, but instead is present in FIG. 2A, e.g. in the first line node to monitor the failure of the communication path. Therefore, ***Gerstel* does not use the detection device present in the WDM system, but instead uses an additional detector**:

> At some time later, it is assumed that the transponder 14-1' of communication path CP1" fails, and that **the monitor block 4' detects the failure in that path CP1" ('N' at block A2). In response to detecting the failure in the path CP1", the monitor block 4' notifies the controller 3' that a failure has occurred in the path CP1" (block A3). The controller 3' then responds by 1) providing a failure signal to the controller 3 indicating that a failure has been detected in the path CP1", 2) configuring the switch 13' to cause the switch 13 to couple the output of protection transponder 17' to an input IP2"' of switch 22-1', and 3) configuring the switch 22-1' to couple that input IP2"' to terminal 10-1', via link L10-1' (block A4). The controller 3 responds to receiving the failure signal from the controller 3' by correlating the failed communication path CP1" to a corresponding "working" communication path (e.g., CP1) from node 1 (block A5)**. For example, the controller 3 may perform this correlation operation by correlating information (received from controller 3') identifying the failed path CP1" with corresponding, pre-stored information relating to corresponding path CP1 from node 1, although in other embodiments, other suitable correlation techniques may also be employed. After block A5, the controller 3 configures the switch 13 to cause output OP2 of the splitter 12-1 from the path CP1 determined at block A5, to an input of the transponder 17 (block A6).

Gerstel, col. 9, ll. 6-30 (emphasis added). As shown above in combination with *Gerstel's* FIGS. 2A, 4A and 4B, *Gerstel's* switch request originates at the monitor 4' in node 2 and is sent to the controller 3' in node 2, where the switch request is sent to both switch 13' in node 2 and controller 3 in node 1. In addition, controller 3 forwards the switch request to switch 13 in node 1. Since the monitor 4' is not included in the WDM system, ***Gerstel's* switch request from the controller 3' is not from the WDM system**. Thus, neither *Kubo* nor *Gerstel* discloses a switching device designed to switch signals in specified working channels to specified protection channels or switch signals in specified protection channels back to specified working channels according to switching requests from the WDM system.

Second, *Gerstel* discloses 1:N protection in an optical terminal of a WDM multi-channel optical communication network, i.e., a pre-defined protection rule. In contrast, paragraph 20 of the present application states that the switching device is designed to "switch signals in **specified** working channels to **specified** protection channels", which means that the WDM system

determines whether there are some signals in the working channels that should be switched to the protection channels, and if so, the WDM system selects the protection channels. Hence, claim 1 of the present invention defines a selected protection rule. This feature is apparently different from *Gerstel.*

Third, *Gerstel*, in column 8 lines 63-67 through column 9 lines 1-2, discloses that the controller 3' maintains the switches 22-1' to 22-n' in a configuration for coupling outputs of the respective transponders 14-1' to 14-n' to the terminals 10-1' to 10-n' respectively, and the controller 3 maintains the switches 22-1 to 22-n in a configuration for coupling outputs of the respective transponders 15-1 to 15-n to the terminals 10-1 to 10-n respectively. It can be seen that this portion discloses a bidirectional switching. Hence, with the solution of *Gerstel*, a communication path is used to protect one failed communication path. In contrast, paragraph 20 of the present application states that the switching device is designed to "switch signals in **specified** working channels to **specified** protection channels", which means that in case the quality of signals in m channels ($1 \leq m \leq M$) is degraded or lost due to channel failure, the OChP module at the transmitting end will switch the signals to protection channels to transmit while the rest N-m signals are transmitted through the working channels. At the receiving end, the OChP module chooses corresponding protection channels to receive said m signals, and the rest N-m signals are received by the working channels. Hence, the present application discloses the unidirectional switching, i.e., only the m faulty channels are specified to switch to specified protection channels. Hence, with the solution of the present application, a certain channel may be used to protect two different channels.

Fourth, *Kubo* cannot be combined *Gerstel* to achieve the solution of claims 1-19. From the above disclosure in *Gerstel*, it can be seen that the protection switching process therein is

carried out through interaction between the two nodes or parties. It is commonly known to those skilled in the art that such is a distributed type switching process. In contrast, *Kubo* relates to a centralized type of protection switching process in which the switching unit performs switching without such interaction between the receiver and the transmitter. Further, *Kubo* solves the problem of preventing an adverse effect on transmission characteristics due to changes in the number of wavelengths involved in redundant switching by a conventional optical redundant switching method in an optical wavelength multiplex transmission system. In contrast, the present invention solves the problem of high wavelength waste and high initial cost of equipment, which is quite different from *Kubo*. Based on the above two reasons, those skilled in the art would not think of combining *Kubo* and *Gerstel* when facing the objective problem of the present invention.

In conclusion, *Kubo* fails to disclose a switching device designed to switch signals according to switching requests from the WDM system, and *Gerstel* fails to disclose that a switching device designed to switch signals in specified working channels to specified protection channels. Hence, the combination of *Kubo* and *Gerstel* fails to disclose at least one element of independent claims 1, 10, and 15. Further, those skilled in the art would not think of combining *Kubo* and *Gerstel*. Consequently, the combination of *Kubo* and *Gerstel* fails to render obvious claims 1-19.

CONCLUSION

Consideration of the foregoing amendments and remarks, reconsideration of the application, and withdrawal of the rejections and objections is respectfully requested by the Applicants. No new matter is introduced by way of the amendment. It is believed that each ground of rejection raised in the Final Office Action dated December 31, 2009 has been fully addressed. If any fee is due as a result of the filing of this paper, please appropriately charge such fee to Deposit Account Number 50-1515 of Conley Rose, P.C., Texas. If a petition for extension of time is necessary in order for this paper to be deemed timely filed, please consider this a petition therefore.

If a telephone conference would facilitate the resolution of any issue or expedite the prosecution of the application, the Examiner is invited to telephone the undersigned at the telephone number given below.

Respectfully submitted,
CONLEY ROSE, P.C.

Date: 3/31/10

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